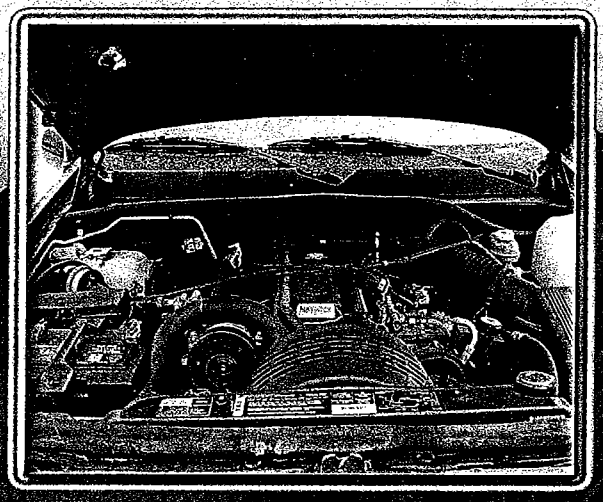
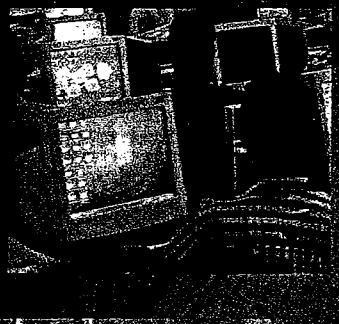
التوظيف والتدريب
EMPLOYMENT & TRAINING





Automotive Repair

Automotives

Direct inquiries to

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Attn: Manager of Vocational and Training Department
Baghdad, Iraq

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500 North Marketplace Drive
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U.S. Office of Job Corps — U.S. Department of Labor
Employment and Training Administration
Office of Youth Services and Job Corps Standards

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Workplace Skills for the 21st Century — Secretary's Commission on Achieving Necessary Skills

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The funding for the development of this curriculum was provided by USAID (United States Agency for International Development)

Overview

Vocational training programs in Iraq are faced with many challenges. Iraq needs a speedy reconstruction and the Iraqi people need a future with the promise of employment and prosperity.

This training will combine occupational skills with technical knowledge and will be competency based. We will customize training to meet employer demands, cultural differences, geographic location, and needs of the trainees. The technical approach is modeled after the U.S. Department of Labor, Employment and Training Administration, Office of Youth Services and Job Corps training model. This curricula is competency-based, meaning that the student actually demonstrates a competency in practice and assessments. The Job Corps vocational training curricula consist of competency objectives with corresponding lessons and tasks or skill assignments. Following completion of each level of difficulty or assigned task, assessment tools determine competency and will help with evaluation and remediation. The competency-based instructional programs will:

- Assess the trainee's needs, including strengths and weaknesses
- Select appropriate instructional goals based on the needs assessment
- Provide trainee-centered instruction aimed at the instructional goals
- Evaluate to determine if the trainee has mastered the goals and can apply them

The instructional design (competency-based) will let the trainees demonstrate competency for the skills they already have and then begin instruction at the point where competency is not demonstrated. From there, the trainee will progress through the competencies listed on a Training Achievement Record until they complete training and are prepared to work.

These instructional materials include a Training Achievement Record (TAR). TARs list each competency required for the trade grouped by skill type. The curricula also include sample lesson plans. The curricula will provide for development in general areas prior to competency in more specific trade areas. This allows those who are not able to complete an entire program to develop skills suitable for lower levels of employment.

This curriculum has been developed in collaboration with MOLSA instructors, Job Corps training experts, and other technical professionals. It was created for use in all MOLSA vocational technical training centers that educate and train students to become competent, entry-level automotive technicians. This curriculum will provide instructors with the necessary ingredients for a complete automotive program. The purpose of this guide is to establish a common language of proficiency standards so that both the Vocational Technical Training Centers and industry have a universal set of standards for automotive programs.

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This curriculum has been developed for use by all Iraq Vocational Technical Training Centers that offer programs in automotive technology. Because of the great diversity among the different regions of the country, this curriculum was designed, to be a flexible document that allows for the differences in instructor methodology. There are also differerences in the length of programs and differences in equipment at some of the MOLSA centers. All content areas and competencies must be integrated into the training center automotive curricula so that students become competent in those areas.

This curriculum does not offer a step-by-step formula for teaching an automotive course. This guide is designed to facilitate the classroom work of automotive instructors but not to replace the decision-maker.

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who successfully pass this course may be certified by MOLSA and will receive documentation from MOLSA.

It is the instructor who organizes instructional materials for effective and efficient learning. And **it is the instructor** who integrates the latest teaching technologies into his or her classroom. It is in support of these professionals and of their students that this curriculum has been developed.

Each vocational course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Module Number and Title (TAR SkillSet)

- Suggested Time to Train on SkillSet - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the module. The curriculum framework should account for approximately 75-80 percent of the time in the course.

- Competencies and Outcomes
  - A competency represents a general concept or performance standard that students are expected to master as a requirement for satisfactorily completing a module. The student, instructor and worksite supervisor (if applicable) will evaluate and record a pre-training mastery level for all skill sets, as well as a post-training mastery level review.

  - The outcomes represent the enabling and supporting knowledge and demonstrated performances that will indicate mastery of the competency at the course level.

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- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.

- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources, however, the only required assessment is completion of the TAR checklist.

- References - A list of suggested references is provided for each unit in the appendix. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested outcomes. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

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Table of Contents

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Program Description

Automotive Repair is a program that prepares students for entry-level employment positions in the automotive repair and service industry or for entry into postsecondary Automotive Technology programs. The course includes instruction in the foundation skills related to safety, tools and equipment usage, measurement, basic automotive diagnostics service, brakes and electrical system service.

The program is aligned with ASE/NATEF- 2002 Automotive Program standards. The student will receive instruction and training in: Brakes, Electrical/Electronics, Engine Performance, and Steering and Suspension. MOLSA will certify completion of all of the skillsets indicating that the student is qualified to apply for ASE/NATEF certification.

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Course Outline

Automotive Repair I

Module	*Title*	*Hours*
Module 1:	Employability skills	5.0
Module 2:	Safety	10.0
Module 3:	General Knowledge	30.0
Module 4:	Lubrication Filters and Fluids	20.0
Module 5:	General Maintenance	105.0
Module 6:	Electrical and Accessory Maintenance	190.0
Module 7:	General Electrical Testing	20.0
Module 8:	Tire Maintenance	8.0
Module 9:	Brake Service	80.0
Module 10:	Suspension Maintenance steering	80.0
Module 11:	Exhaust System	10.0
Module 12:	Battery, Starter and Alternator Service	40.0
Module 13:	Employer Specific Skills	10.0
Module 14:	Advanced Electrical/Electronic Systems	40.0
Module 15:	Engine Performance	220.0
Module 16:	Steering and Suspension Systems	95.0
Total		***963***

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Module 1
Employability Skills
[5 hours]

Competencies and Outcomes	Strategies for Competencies
1. Employability Skills. a. Demonstrate the ability to dress appropriately for work. b. Demonstrate the ability to arrive for work on time. c. Demonstrate the ability to respond appropriately to supervision. d. Demonstrate the ability to follow directions and carry out with minimum supervision. e. Demonstrate the ability to listen effectively. f. Demonstrate the ability to ask for clarification when further information is required. g. Demonstrate the ability to share information and explain procedures to another person both orally and in writing. h. Demonstrate the ability to take initiative. i. Demonstrate the ability to satisfy customers.	**Teaching:** • Introduce employability skills through discussion. • Define trade terms related to employability skills. • Students will use available resources to research information about careers and educational opportunities in the automotive field. • Discuss the role of a team member and leader. Assign the students roles within a team and have them role play a situation in which there is a conflict which must be resolved. • Discuss appropriate work ethics standards. Have the students list what they believe to be the most common problems within the automotive profession. • Divide students into groups. One

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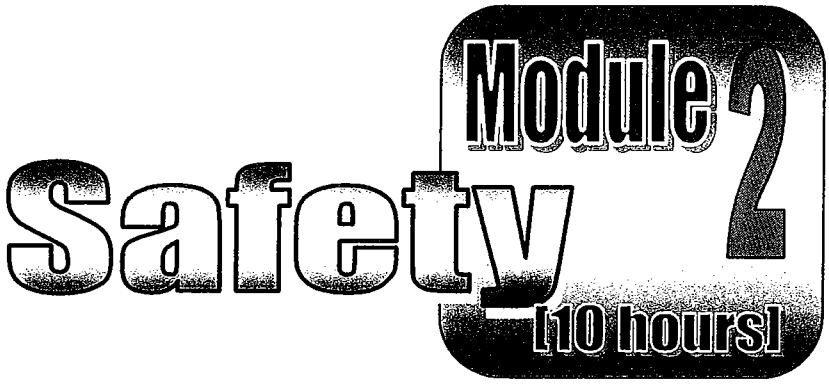
j. Demonstrate the ability to work as a member of a team. k. Demonstrate the ability to work harmoniously with diverse races, sexes, ages and cultures. l. Demonstrate the ability to troubleshoot and solve problems. m. Demonstrate the ability to access and use information from manuals, computers and work orders. n. Demonstrate the ability to maintain good hygiene. o. Demonstrate the ability to stay on task. p. Demonstrate the ability to maintain tools and equipment properly.	team is the customer and the other is the Auto/Technicians. Describe the customer concern to the service advisor who will provide an explanation of the processes that will need to be diagnosed and solved. • The student will be given a work order. The work order will contain written instructions of a specific job. The student will complete the work order. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.



Competencies and Outcomes	Strategies for Competencies
1. Safety a. Demonstrate the ability to use hand and and power tools safely. b. Demonstrate the ability to safely hoist vehicles. c. Demonstrate the ability to safely raise vehicles using floor jacks and jack hands. d. Demonstrate the ability to safely move vehicles(standard and automatic transmission types). Students must possess a drivers license.	**Teaching:** • Identify, discuss and demonstrate terms, rules and procedures related to shop/lab and industry safety. • Use the guidelines provided for personal safety (i.e. clothing, hair, eyes, and ears). Divide the students into pairs and assign each pair one of the guidelines. Each pair will demonstrate the "do's and don't" of the selected guideline. • Divide the students into teams and have them develop scenarios of hazards and accidents. One team will read a scenario and the other team will provide proper safety measures which should have been used to prevent the hazardous situation. NOTE: SAFETY IS TO BE TAUGHT AS AN ONGOING PART OF THE COURSE. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 3 General Knowledge [30 hours]

Competencies and Outcomes	Strategies for Competencies
1. General Knowledge. a. Identify and use basic weights and measurements. b. Demonstrate the proper use of the service manuals, technical bulletins, repair orders. c. Identify and safely use hand and power tools. d. Identify shop layout and equipment. e. Identify automotive systems. • Engine theory • Transmission/drive train • Brake systems • Safety systems • Suspension and steering systems • Electrical /electronic systems • Heating, ventilation, air conditioning systems.	**Teaching:** • The instructor will review automotive supply catalogs and pictures of tools and equipment. • The instructor will discuss and demonstrate all of the automotive systems. • The instructor will provide a worksheet on measurement and demonstrate measuring a given item using a variety of measuring instruments. The student will then measure given items and record answers. • Divide the students into groups and assign each group a specific task. Have each group construct a poster, listing components and the diagram of the task. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 4
Lubrication, Filters and Fluids
[20 hours]

Competencies and Outcomes	Strategies for Competencies
1. Lubrication, Filters and Fluids. a. Change engine oil and oil filter. b. Lubricate chassis. c. Check and correct vehicle fluid level. d. Service and replace air filters. e. Inspect engine assembly, transmission, deferential, power steering, and rack and pinion for leaks. f. Remove and replace fuel filters.	**Training:** • Demonstrate automobile maintenance: lubrication, oils and fluids and general inspection service. • Discuss importance of scheduled maintenance, the Owner's Manual and ways to ensure vehicle performance and longevity. • Have students complete a work order and maintenance record for a given vehicle. Have students share their process with the rest of the class. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 5
General Maintenance
[105 hours]

Competencies and Outcomes	Strategies for Competencies
1. General Maintenance. a. Inspect, remove, and install engine drive belts (serpentine and r-types). b. Inspect remove and install engine cooling hoses. c. Drain, flush and refill cooling system. d. Perform cooling system, pressure test (including pressure cap) and recovery systems test. e. Remove and install spark plugs and wires. f. Remove, service and install distributor caps and rotor. g. Drain and refill transmission, transaxle, deferential and transfer case.	**Teaching:** • Complete a full maintenance of an automobile. (Belts, hoses, flushing cooling system, pressure tests, plugs, wires, cap and rotor, and transmission. • Divide the students in groups and assign each group a specific task. Have each group report on their process. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 5
General Maintenance
[105 hours]

Competencies and Outcomes	Strategies for Competencies
1. General Maintenance. a. Inspect, remove, and install engine drive belts (serpentine and r-types). b. Inspect remove and install engine cooling hoses. c. Drain, flush and refill cooling system. d. Perform cooling system, pressure test (including pressure cap) and recovery systems test. e. Remove and install spark plugs and wires. f. Remove, service and install distributor caps and rotor. g. Drain and refill transmission, transaxle, deferential and transfer case.	**Teaching:** • Complete a full maintenance of an automobile. (Belts, hoses, flushing cooling system, pressure tests, plugs, wires, cap and rotor, and transmission. • Divide the students in groups and assign each group a specific task. Have each group report on their process. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 6

Electrical and Accessory Maintenance

[190 hours]

Competencies and Outcomes	Strategies for Competencies
1. Electrical and Accessory Maintenance. a. Inspect, remove, install and adjust headlights. b. Inspect, remove, and install parking and turn signal bulbs. c. Inspect, remove and install windshield wiper blades and arms.	**Teaching:** • Identify and interpret electrical systems concerns; showing necessary action. • Demonstrate the use of electrical circuits using principles of electricity and wiring diagrams. • Have students complete a total electrical and accessory maintenance on an automobile. Have each student discuss their process. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 7
General Electrical Testing
[20 hours]

Competencies and Outcomes	Strategies for Competencies
1. General Electrical Testing. a. Use wiring diagram during testing of electrical circuit problems. b. Check electrical circuits with a test light. c. Check electrical circuits using a digital multimeter (DMM). d. Inspect and test fusible links, circuit breakers and fuses.	**Teaching:** • Demonstrate the use of a test light, voltmeter, ammeter, and ohmmeter. • Demonstrate how to check electrical circuits using a fused wire, Inspect and test fusible link, circuit breaker, and fuses. • Demonstrate how to locate and measure shorts and grounds, opens, connectors, relays and wires. • The instructor will explain and demonstrate each task. The student will perform the tasks: o The flow of electricity in a simple circuit, including voltage, amperage, and resistance. o The use of service information to locate and interpret identification numbers. o The proper use of a digital multimeter during electrical circuit diagnosis. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 8
Tire Maintenance
[8 hours]

Competencies and Outcomes	Strategies for Competencies
1. Tire Maintenance. a. Mount and balance. b. Inspect tires for irregular wear patterns. c. Rotate tires and properly torque lug nuts. d. Repair tubeless tires (plug and patch repairs). e. Inspect and replace wheel studs. f. Inspect hub seals and bearings.	**Teaching:** • Demonstrate complete tire maintenance to the class. • Have the students perform tire diagnosis and repair, following the TAR Checklist. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 9 Brake Service [80 hours]

Competencies and Outcomes	Strategies for Competencies
1. Brake Service. a. Remove and replace brake pads and shoes. b. Resurface brake rotors and drums, consistent with manufacturer's specification. c. Remove, service or replace front and rear wheel bearings and seals. d. Adjust parking brake.	**Teaching:** • Demonstrate all brake elements listed on the TARs. • Have the students demonstrate each brake service and have another student evaluate process and work. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 10
Suspension Maintenance
[80 hours]

Competencies and Outcomes	Strategies for Competencies
1. Suspension Maintenance. a. Inspect front wheel drive, CV boots. b. Inspect front/rear shock absorbers. c. Inspect McPherson strut assemblies.	**Teaching:** • Demonstrate the tasks to diagnose and repair suspension systems. • The students will complete the tasks listed on the TAR and have another student review their work. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 11
Exhaust System
[10 hours]

Competencies and Outcomes	Strategies for Competencies
1. Exhaust System. a. Remove and replace exhaust system components.	**Teaching:** • Demonstrate the replacement of the exhaust system. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 12
Battery, Starter and Alternator Service
[40 hours]

Competencies and Outcomes	Strategies for Competencies
1. Battery, Starter and Alternator Service. a. Inspect, test and identify battery condition. b. Perform battery capacity (load high-rate discharge) test: determine needed repairs. c. Perform charging system tests. d. Understand the importance to maintain and restore electronic memory functions. e. Perform slow/fast battery charge. f. Inspect and clean battery cables, connectors, clamps and hold-downs: repair as needed. g. Remove and replace batteries. h. Start a vehicle using jumper cables and a battery as auxiliary power supply. i. Remove and replace alternators. j. Remove and replace starters.	**Teaching:** • Demonstrate all of the TAR elements for battery and alternator. • Students will perform: o Battery state-of-charge and capacity test. o Maintain electronic memory functions. o Inspect, clean, and secure cables, connector's clamps and hold-downs. o Start a car using jumper cables and auxiliary power supply. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Appendix A

TAR

(Training Achievement Record)

Evaluation Checklist for Automotive Repair

Directions for Completing TARs

A. When the student performs a task listed in the "DUTIES AND TASKS" column, the instructor should rate the student's level of performance by circling a, b, or c in the "PERFORMANCE RATING" column.

RATING

a - Proficient and able to teach others	The student consistently performs the task accurately without supervision. The student possesses sufficient skill to teach the task to others.
b - Proficient	The student performs the task to industry standards with little or no supervision. This is the minimum performance rating for TAR skill completion.
c - Exposed/not proficient	The student has been introduced to the task, but cannot perform the task to industry standards.

1. If the student performs the task at a level c, circle the number in pencil so that it can later be erased and entered permanently as b or a when the student improves his/her performance. A performance level of b is satisfactory (passing) and can be entered permanently or, at the instructor's discretion, circled in pencil to allow the student to improve his/her performance at a later date.
2. When the student performs the task to the instructor's satisfaction, (**at a level of b or a**) circle the appropriate performance rating, and enter the date in the **"DATE COMPLETED"** column. The instructor and student should initial the **DUTY** area when **all the tasks** in that duty area are completed.

B. When the student completes the TAR or terminates the program before completing the TAR, the instructor must finalize the TAR by doing the following:

1. Check the appropriate box and enter the date that the student completed the TAR or terminated the training program in the space provided at the top of page 1:

□ Completed or □ Terminated Training: _____
Date

AUTOMOTIVE REPAIR
Service Apprentice

TRAINING ACHIEVEMENT RECORD (TAR) FOR:

Name: _____

IDN: _____

Date Entered Training: _____

☐ Completed or ☐ Terminated Training: _____
Date

CENTER'S NAME: _____

_____

Address: _____

_____

Phone: _____

Instructor: _____

a - Proficient and able to teach others; b - Proficient; c - Exposed/not proficient

Automotive Repair / Service Apprentice

_____

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
A. EMPLOYABILITY SKILLS				
1. Demonstrate the ability to dress appropriately for work.	a b c *			
2. Demonstrate the ability to arrive for work on time. Be dependable.	a b c			
3. Demonstrate the ability to respond appropriately to supervision.	a b c			
4. Demonstrate the ability to follow directions and carry out with minimum supervision.	a b c			
5. Demonstrate the ability to listen effectively.	a b c			
6. Demonstrate the ability to ask for clarification when further information is required.	a b c			
7. Demonstrate the ability to share information and explain procedures to another person both orally and in writing.	a b c			
8. Demonstrate the ability to take initiative.	a b c			
9. Demonstrate the ability to satisfy customers.	a b c			
10. Demonstrate the ability to work as a member of a team.	a b c			
11. Demonstrate the ability to work harmoniously with diverse races, sexes, ages and cultures.	a b c			
12. Demonstrate the ability to troubleshoot and solve problems.	a b c			
13. Demonstrate the ability to access and use information from manuals, computers, and work orders.	a b c			
14. Demonstrate the ability to maintain good hygiene.	a b c			
15. Demonstrate the ability to stay on task.	a b c			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
16. Demonstrate the ability to maintain tools and equipment properly.	a b c			
B. SAFETY				
1. Demonstrate the ability to use hand and power safely	a b c			
2. Demonstrate the ability to safely hoist vehicles.	a b c			
3. Demonstrate the ability to safely raise vehicles using floor jacks and jack hands.	a b c			
4. (Optional) demonstrate the ability to safely move vehicles (standard and automatic transmission types) .Students must possess a valid drivers license .	a b c			
C. GENERAL KNOWLEDGE				
1. Identify and use basic weights and measurements.	a b c			
2. Demonstrate the proper use of the service manuals (print and on-line),technical bulletins repair orders and other reference material	a b c			
3. Identify and safely use hand and power tools.	a b c			
4. Identify shop layout and equipment.	a b c			
5. Identify automotive systems.	a b c			
a. Engine theory	a b c			
b. Transmission /drive train	a b c			
c. Brake systems	a b c			
d. Safety systems	a b c			
e. Suspension and steering systems	a b c			
f. Electrical / electronic systems	a b c			
g. Heating, ventilation, air conditioning systems.	a b c			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
D. LUBRICATION, FILTERS AND FLUIDS				
1. Change engine oil and oil filter .	a b c			
2. Lubricate chassis.	a b c			
3. Check and correct vehicle fluid levels.	a b c			
4. Service and replace air filters .	a b c			
5. Inspect engine assembly, transmission, deferential, power steering and rack & pinion for leaks.	a b c			
6. Remove and replace fuel filters.	a b c			
E. GENERAL MAINTENANCE				
1. Inspect, remove, and install engine drive belts (serpentine and V-types).	a b c			
2. Inspect, remove, and install engine cooling hoses.	a b c			
3. Drain, flush, and refill cooling system.	a b c			
4. Perform cooling system, pressure test (including pressure cap)and recovery system tests.	a b c			
5. Remove and install spark plugs and wires.	a b c			
6. Remove, service and install distributor cap and rotor.	a b c			
7.Drain and refill transmission, transaxle, differential and transfer case.	a b c			
F. ELECTRICAL AND ACCESSORY MAINTENANCE				
1. Inspect, remove, install and adjust headlights.	a b c			
2. Inspect, remove and install parking and turn signal bulbs.	a b c			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
3. Inspect, remove and install windshield wiper blades and arms.	a b c			
G. GENERAL ELECTRICAL TESTING				
4. Use wiring diagram during testing of electrical circuit problems.	a b c			
5. Check electrical circuits with a test light.	a b c			
6. Check electrical circuits using a digital multimeter (DMM)	a b c			
7. Inspect and test fusible links, circuit breakers, and fuses; replace as needed.	a b c			
H. TIRE MAINTENANCE				
1. Mount and balance.	a b c			
2. Inspect tires for irregular wear patterns.	a b c			
3. Rotate tires and properly torque lug nuts.	a b c			
4. Repair tubeless tires (plug and patch repairs).	a b c			
5. Inspect and replace wheel studs.	a b c			
6. Inspect hub seals and bearings.	a b c			
I. BRAKE SERVICE				
1. Remove and replace brake pads and shoes.	a b c			
2. Resurface brake rotors and drums consistent with manufacturer's specifications.	a b c			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
3. Remove, service or replace front and rear wheel bearings and seals.	a b c			
4. Adjust parking brake.	a b c			
J. SUSPENSION MAINTENANCE				
1. Inspect front wheel drive CV boots.	a b c			
2. Inspect front/rear shock absorbers.	a b c			
3. Inspect MacPherson strut assemblies.	a b c			
K. EXHAUST SYSTEM				
1. Remove and replace exhaust system components.	a b c			
L. BATTERY, STARTER AND ALTERNATOR SERVICE				
1. Inspect, test, and identify battery condition.	a b c			
2. Perform battery capacity (load,high-rate discharge) test; determine needed repairs.	a b c			
3. Perform charging system tests.	a b c			
4. Understand the importance to maintain or restore electronic memory functions.	a b c			
5. Perform slow/fast battery charge.	a b c			
6. Inspect and clean battery cables, connecters, clamps, and hold-downs; repair or replace as needed.	a b c			
7. Remove and replace batteries.	a b c			
8. Start a vehicle using jumper cables and a battery or auxiliary power supply .	a b c			
9. Remove and replace alternators.	a b c			
10. Remove and replace starters.	a b c			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
M. EMPLOYER SPECIFIC SKILLS				
1.	a b c			
2.	a b c			
3.	a b c			
4.	a b c			
5.	a b c			

a - Proficient and able to teach others; b - Proficient; c - Exposed/not proficient

Appendix B

Workplace Skills for the 21st Century for Automotive Repair

For Module 1- Employability Skills

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 2- Safety

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 3- General Knowledge

WP1 Allocates resources (time, money, materials and facilities, and human resources).
WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 4- Lubrication Filters and Fluid

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 5- General Maintenance

WP1 Allocates resources (time, money, materials and facilities, and human resources).
WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP5 Selects, applies, and maintains/troubleshoots technology.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 6- Electrical and Accessory Maintenance

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP5 Selects, applies, and maintains/troubleshoots technology.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 7- Tire Maintenance

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 8- Brake Service

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 9- Suspension Maintenance

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 10- Exhaust System

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

Appendix C

Suggested References

For Module 1- Employability Skills

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (instructor guide, student guide, and workbook available)

For Module 2- Safety

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom —Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

For Module 3- General Knowledge

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (instructor guide, student guide, and workbook available)

For Module 4- Lubrication Filters and Fluid

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (instructor guide, student guide, and workbook available)

For Module 5- General Maintenance

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (instructor guide, student guide, and workbook available)

For Module 6- Electrical and Accessory Maintenance

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum–Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (Instructor guide, student guide, and workbook available)

For Module 7- Tire Maintenance

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroo—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (Instructor guide, student guide, and workbook available)

For Module 8- Brake Service

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (Instructor guide, student guide, and workbook available)

For Module 9- Suspension Maintenance

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology*. Tinleypark, IL: Goodheart-Wilcox. (Instructor guide, student guide, and workbook available)

For Module 10- Exhaust System

Automotive excellence (Vol. 1). (2004). Peoria, IL: Glencoe McGraw-Hill. (Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive excellence (Vol. 2). (2004). Peoria, IL: Glencoe McGraw-Hill.

(Instructor guide, student guide, CD-ROM, transparency unit, and technical application guide available)

Automotive technology: The electronic classroom—Basic automotive. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Brakes. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Electrical/electronics. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Engine performance. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology: The electronic classroom—Steering and suspension. (2004). Upper Saddle River, NJ: Pearson Education. (Text and DVD available)

Automotive technology curriculum—Basic automotive. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Brakes. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Electrical/Electronics. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Engine performance. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Automotive technology curriculum—Steering and suspension. (2003). Columbia, MO: Instructional Materials Laboratory. (Instructor guide, student guide, workbook, CD-ROM, student task list, and transparencies available)

Duffy, J. E. (2004). *Modern automotive technology.* Tinleypark, IL: Goodheart-Wilcox. (Instructor guide, student guide, and workbook available)

Recommended Tools & Equipment

ITEM	QTY
air compressor (220 volt, 80 gallon min. storage tank) هوائي ضاغط	1
bench grinder منضدية كوسرة	2
hydraulic press with adapters (25 Ton) هيدروليكي مكبس	1
parts cleaning tank and gloves (non-solvent based cleanser), or container service	1
tire mounting machine (rim clamp suggested) جهاز تركيب الاطار	1
wheel alignment equipment, 4 wheel with rack (including alignment tools) اداة ميزانية العجلات	1
wheel balancer, electronic type ميزانية العجلات ؛ نوع كهربائي	1
engine stand المحرك منصة لوضع	4
portable crane, 1/2 ton رافعة متحركة	1
12 drawer tool chest w/10 drawer roller cabinet (molded tray compartments to quickly inventory tools), 1 cabinet for service bay; 2 cabinets for tool crib صندوق عدة ذو 12 درجا	7
workbenches with vises منضدة عمل مع ملزمة	5
hoist(s), twin post رافعة ذات مسند مزدوج	5
wheel chocks, pair	5 pair
air blow gun (meeting OSHA requirements) منفاخ هواء (مسدس)	5
allen wrench set, standard (.050" - 3/8") سيت لوي النكي	5
allen wrench set, metric (2mm - 7mm) سيت لوي النكي	5
battery post cleaner منظف عمود البكارية	5
battery terminal pliers كماشة أطراف البطارية	5

battery terminal puller نازعة اطراف البطارية	5
brake adjusting spoon أداة تنظيم المكابح	5
chisels: cape 5/16", cold 3/8", 3/4" ازميل	5 sets
chisel holder الازميل حامل	5
claw type pickup tool أداة التقاط بشكل مخلب	5
combination wrenches: standard (1/4" - 1-1/4"), metric (7mm - 32mm) مجموعة مفاتيح الربط	5 sets
crowfoot wrench set, metric (7mm - 32mm) سيت عتلات مفاتيح الربط	5 sets
crowfoot wrench set, standard (1/4" - 1-1/4") سيت عتلات مفاتيح الربط	5 sets
feeler gauge (blade type): .002" - .040", .006mm - .070mm مقياس مجسي	5
flashlight مشعل كهربائي	5
fuse puller الكهربائي نازع الصمام	5
hack saw منشار	5
hammers: 16 oz. ball peen, dead blow plastic mallet مطارق	5
inspection mirror فحص مراة	5
jack stands (safety stands), pair مساند الرافعة	10 pair
magnetic pickup tool اداة التقاط مغناطيسية	5
pliers: combination 6", hose clamp, locking jaw (curved and straight jaw), needle nose 6", side cutting, slip joint (water pump) كماشات	5 sets
pry bars: rolling head, straight قضبان نزع: مستقيمة ذات رأس منزلق،	5
punches: center, brass drift, brass drift, pin 1/8", 3/16", 1/4", 5/16", taper 3/8", 1/2", 5/8" أحزمة	5 sets
scraper: carbon 1"; gasket I" كاشطة	5
screwdriver, blade type: stubby, 6", 9", 12", offset درنفيسات	5 sets

screwdriver, phillips: stubby #1, #2, 6" #1,#2, 12", #3, offset #2 درنفيسات	5 sets
screwdriver, Torx® socket set: T-10, T-15, T-20, T-25, T-27, T-30 درنفيسات من نوع توركس	5 sets
socket set, 1/4" drive: 1/4"-1/2" standard depth, 1/4"-1/2" deep, 5mm-12mm, standard depth, 5mm-12mm deep, flex/universal type, 3", 6" extensions, ratchet سيت مفاتيح المقابس - سوكتات	5 sets
socket set, 3/8" drive: 5/16"-3/4" standard depth (12 point), 3/8"-3/4" deep (12 point), 5mm-19mm standard depth, 5mm-19mm deep, 3", 6", 10", 20" extensions, flexhead ratchet, ratchet, spark plug sockets 5/8", 13/16", speed handle, universal joint, flexible socket set 3/8"-3/4", flexible socket set 9mm-19mm سيت مفاتيح المقابس - سوكتات	5 sets
socket set, 1/2" drive: 1/2"-1-1/8" standard depth, 1/2"-1-1/8" deep, l2 mm-30 mm standard depth, l4 mm-27 mm deep, 3", 6", 10" extensions, flex handle (breaker bar), ratchet سيت مفاتيح المقابس - سوكتات	5 sets
tape measure, 1" x 25' مقياس شريطي	5
test light (12V) مصباح اختبار	5
tire pressure gauge مقياس ضغط الاطارات	5
torque wrench, 2" drive (50-250 lb. ft.) مفتاح ربط بالعزم	5
wire brush فرشاة سلكية	5
creeper (2 per service bay) مانعة الانزلاق	10
drain pan (2 per bay–1 oil; 1 anti-freeze) حاوية تفريغ	10
air blow gun, OSHA standard (1 per service bay) مسدس منفاخ هواء	5
valve core removing tool أداة ازالة قلب الصمام	5
face shield غطاء للوجه	5

fender covers, pair أغطية واقية	5
impact wrench - 3/8" drive مفاتيح تثبيت	5
tire inflator chuck نفخ الاطارات تشوك	5
trouble/work light مصباح العمل/ المشاكل	5
wire and terminal repair kit عدة تصليح الأسلاك والأطراف	5
brake spring installer جهاز تركيب زنبرك المكابح	5
brake spring pliers كماشات زنبرك المكابح	5
antifreeze tester مانع التجمد مقياس	5
files: coarse 6" and 12", fine 6" and 12", half round 12", round 6" and 12" مبارد خشنة دائرية ناعمة دائرية ونصف	1 set
flare nut (tubing) wrenches: 3/8" - 3/4", 10mm - 17mm مفاتيح ربط الصواميل اللامعة	1 set
hammers: 16 oz. ball peen, brass, dead blow plastic mallet, plastic tip, rubber mallet مطارق	1
adjustable wrenches - 6", 10" and 12" مفاتيح ربط قابلة للتغيير	1
jumper wire set (with various adapters) مجموعة أسلاك مع التوصيلات	2 sets
screwdriver, impact driver set درنفيسات سيت امباكت	2 sets
screwdriver, posidrive set # 1, #2, #3, #4 درايف درنفيسات سيت بوسي	1 set
reverse Torx® socket set مفاتيح عكسية نوع توركس	1 set
screw starter: phillips, standard	2
torque wrench: 8" drive (10 - 250 lb. in.), 3/8" drive (5-75 lb. ft.), 1/2" drive (50-250 lb. ft.) مفايح ربط بالعزم	1 set
torque stick set	1 set
air chisel set (various bits) سيت ازميل هوائي	1 set
air ratchet (3/8" drive) ماسكة هوائية	3
battery charger w/booster شاحنة بطارية	2

bearing packer (hand operated) ناقل حركة يدوي	1
belt tension gauge مقياس شد الحزام	1
compression tester فحص الضغط جهاز	2
computer scan tool (hand held) or personal computer (PC) with interface capability for on-board diagnostics (OBD II compliant recommended) أداة الفحص بالحاسوب	1
coolant/combustion gas detector (recommended) مستكشف غاز محلول التبريد/الاحتراق	1
cooling system pressure tester and adapter التبريد جعاز فحص ضغط جهاز	2
constant velocity joint (CV) service tools: boot installation tool, boot clamp pliers or crimping ring	1 set
cylinder leakage tester جهاز فحص التسريب في الاسطوانات	1
dial indicator with flex arm and clamp base قرص مؤشر	1
digital multi-meter with various lead sets مقياس ديجيتال	2
drill, 3/8" variable speed, reversible دريل	1
drill, 1/2" variable speed, reversible دريل	1
extension cord, 12 ga., 50'	2
floor jack (3 ton) رافعة أرضية	2
hand held vacuum pump منفاخ هوائي يحمل باليد	2
impact socket sets, 3/8" drive (standard and metric) مفاتيح الربط سيت	2 sets
impact sockets, 1/2" drive (7/16" - 1-1/8") سيت مفاتيح الربط	2 sets
impact sockets, 1/2" Drive (12mm - 36mm) سيت مفاتيح الربط	2
impact wrench, 1/2" Drive سيت مفاتيح الربط	2

jumper cables كيبلات	1
master puller set سيت أدوات النزع	1 set
micrometers, 0-1", 1-2", 2-3", 3-4" (outside type) أجهزة قياس مايكروية - دقيقة	1 set
oil can, pump type زيت - مضخة صفيحة	2
oil filter wrench (assorted sizes) مفتاح ربط فلتر الزيت	1 set
oxy-acetylene torch, with cart مشعل الاوكسي استيلين مع عربة	1
remote starter switch مفتاح البدء عن بعد	1
screw extractor set لنزع البراغي سيت	2 sets
snap ring pliers set, external سيت كماشات نازع حلقي	1 set
snap ring pliers set, internal سيت كماشات نازع حلقي	1 set
soldering gun مسدس لحيم	2
spark plug boot puller نازعة غطاء شمعات القدح	2
tach/dwell meter (optional)	1
tap and die set, standard	1 set
tap and die set, metric	1 set
tube quick disconnect tool set سيت ادوات الفتح السريع للاطار	1 set
tubing cutter انبوبي كتر	1
twist drill set, 1/64" - 1/2" (1 set high speed steel; 1 set cobalt bits) سيت دريل لولبي	2 sets
waste oil receptacle with extension neck and funnel الزيت مع قمع وعاء تبديل	1
headlight aimer امامي موجه مصباح	1
pressure washer مغسلة بالضغط	1
wet/dry vacuum هوائية رطبة/جافة مكنسة	1
ball joint press مفصل كروي مكبس ذو	1
brake pedal depressor مخفف دواسة المكابح	1
hand grease gun تزييت كريز مسدس	2
inner tie rod end tool, set سيت ربط داخلي	1 set

pitman arm puller	1
spring/strut compressor tool أداة ضغط زنبرك/ نفخ	1
valve spring compressor ضاغطة صمام الزنبرك	1
wheel weight pliers كماشات وزن الاطارات	2
brake assembly washer, OSHA approved (or contract service provided by center) البريك مغلسة مجموعة	1
brake bleeder, pressure مفرغة المكابح، الضغط	1
caliper piston retractor set مقياس ماسكة المكبس- البستن	1 set
brake disc micrometer مقياس مايكروي للدسكات	1
brake drum micrometer مقياس مايكروي لطبلة المكابح	1
brake lathe (with disc and drum service attachments, mobile or stationary) مخرطة البريك	1
brake shoe adjusting gauge مقياس تعييربريك	1
refrigerant recovery/recycling/recharging machine (HFC-134a) جهاز شحن/تصليح/تجديد التبريد	1
air conditioner compressor seal and clutch bearing service tools أدوات تصليح كمبريسر التبريد	1 set
leak detector (electronic) مستكشف تبريد الكتروني	1
thermometer ثرموميتر	1
A/C service port adapter set سيت توصيل منافذ التبريد	1
battery/starter/charging system tester شاحنة-فحص-تشغيل البطارية	1

hand held scan tool with ABS capabilities أداة فحص محمولة باليد ذات خاصية ABS	1
engine analyzer - with scope (lab scope with ignition display capability acceptable) المحرك الكتروني جهاز فحص	1
four or five gas exhaust analyzer العادم جهاز فحص	1
fuel injection cleaner, set سيت تنظيف حاقن الوقود	1 set
injector pulse tester جهاز فحص الحقن الذبذبة	1
oxygen sensor socket, set سيت مفاتيح فحص الاوكسجين	1 set
pinch-off pliers كماشات قارصة	1
sending unit socket, set سيت مفاتيح وحدة الارسال	1 set
spark plug thread tap مسننة شمعات القدح	1
static strap شريط ثابت	1
timing advance light مصباح مؤقت	1
vacuum/pressure gauge مقياس الضغط	1
front wheel drive engine support fixture مثبت العجلات الامامية	1
powertrain (cradle) removal and installation tool	1
transmission jack رافعة نقل	1
clutch alignment set الكلتش سيت تعيير	1set
connector pick tool set سيت التقاط تامرابط	1
FROM LIST 2	
3/4" air impact wrench مفاتيح ربط	1
Engine coolant (recovery/recycle/exchanger) محلول تبريد المحرك	1
Microcomputer with monitor, printer, CD-ROM/DVD (player and burner) drive and cables كامل جهاز حاسوب	6
Asbestos containment/removal device اداة	1

ازالة حاوية الاسبستوس	
Refrigerant recovery/recycling machine (R-12) جهاز تصليح/تجديد جهاز التبريد	1
Ultraviolet leak detection device اداة استكشاف التسرب بالاشعة فوق البنفسجية	1
Power steering and transmission fluid exchanger مبدل سائل الباور ستيرنغ وناقل الحركة	1
Valve and valve seat resurfacing equipment وقاعدة الصمام أداة تشكيل الصمام	1
Valve guide repair unit وحدة تصليح قيادة الصمام	1
1/2" air impact wrench مفاتيح ربط	1
Gear lube dispenser	2
soldering iron (25 watt pencil type) حديد اللحيم	1
Vernier calipers (0-6" and 0-125mm)	1 set
Shock absorber tools أدوات ممتص الصدمة	1
Brake cylinder clamps مثبتات اسطوانة المكابح	1
Manifold gauge set (R12 and 134a)	1
Carburetor plug and angle gauge set سيت تثبيت وقياس زاوية الكالابوريتر	1
Computer carburetor tools ادوات حاسوب خاصة بالكاربوريتر	1
Spark tester القدح جهاز فحص	1
Valve spring tester جهاز فحص زنبرك الصمام	1
Testing device for Lighting	6
Liquid batteries (different size) بطارية سائلة مختلف الاحجام	8
Braking machine 60 tons ماكنة كبح سعة 60 طن	3
Chest resurrecting machine ماكنة لفحص السيارة صدر	3
Computerized testing machine for car cylinders ماكنة اختبار الكترونية لاسطوانات السيارات	6

Device for brake testing with accessories and spare parts جهاز لاختبار البريك وملحقاته وقطع الغيار	6
Device for confirm the brake base جهاز لتثبيت قاعدة المكابح	3
Device for pumping oil in automatic gear جهاز لضخ الدهن خاص بالاوتوماتيك كير	6
Engines work with gas and gas oil (diesel) محركات تعمل بالكاز والديزل	11
Explanation section of vehicles مقاطع توضيحية للسيارات	6
Gauge for testing and calibration diesel pump مقياس فحص مضخة الديزل	3
Gauge for testing fuel مقياس لاختبار الوقود	8
Gauge for testing mixing of fuel and air مقياس لفحص البنزين والهواء	6
Gauge for testing nozzles مقياس فحص النوزلات	6
Gauge for testing oil مقياس لاختبار الدهن	6
Gauge for testing radiator مقياس لاختبار الاشعاع	8
Gauge for testing spreader for modern vehicles مقياس لفحص الموزع في السيارات الحديثة	8
Oiling machine (working with pressurized air) ماكنة تزييت تعمل بالهواء المضغوط	3
Testing device for back axle جهاز لاختبار البريك اكسل	6
Testing device for rotation shut جهاز لاختبار المغلقة عملية الدوران	6
Vertical driver (for screws) مفك براغي عمودى	3
Vertical smoothing machine ماكنة تنعيم عمودية	3
Welding machine(electrical Arc) ماكنة لحام ذات قوس كهربائى	3
Welding machine(gas) ماكنة لحام غازية	3
STUDENT TOOLKIT	
Tool chest, 4 drawer صندوق عدة	1

safety glasses نظارات وقاية	1 pair
tire pressure gauge مقياس ضغط الاطار	1
belt tension gauge مقياس شد الحزام	1
CV boot clamp crimping tool ملزمة	1
wire brush سلكية فرشاة	1
allen wrench set, standard (.050" - 3/8") سيت النكي	1 set
allen wrench set, metric (2mm - 7mm) سيت النكي	1 set
spark plug gap guage مقياس فجوة شمعة القدح	1
battery post cleaner منظف عمود البطارية	1
battery terminal pliers كماشة اطراف البطارية	1
battery terminal puller نازعة اطراف البطارية	1
chisels: cape 5/16", cold 3/8", 3/4" ازميل	1 set
chisel holder الازميل حامل	1
combination wrenches: standard (1/4" - 1-1/4"), metric (7mm - 32mm)	1
feeler gauge (blade type): .002" - .040"; .006mm - .070mm مقياس متحسس	1
flash light كهربائي مصباح	1
ruler, 12" مسطرة	1
fuse puller الصمام الكهربائي نازع	1
hack saw منشار	1
hammer, 16 oz. ball peen مطرقة	1
magnetic pickup tool أداة التقاط ممغنطة	1
pliers: combination 6", hose clamp, locking jaw (curved and straight jaw), needle nose 6", side cutting, slip joint (water pump) كماشات	1 set
pry bars, rolling head قضبان نزع	1
pry bars, straight قضبان نزع	1
punches: center, brass drift, brass drift, pin 1/8", 3/16", 1/4", 5/16", taper 3/8", 1/2", 5/8" مثاقب- خرامات نحاسية	1
scraper: carbon 1"; gasket l" كاشطة	1

screw driver, blade type: stubby 6", 8", 12", offset درنفيسات	1
screw driver, Phillips: stubby #1, #2; 6" #1, #2; 12" #3; offset #1, #2 درنفيسات	1
Torx® socket set: T-10, T-15, T-20, T-25, T-30 سيت مفاتيح ربط توركس	1 set
socket set, 1/4" drive: 1/4"-1/2" standard depth, 1/4"-1/2" deep, 5mm-12mm, standard depth, 5mm-12mm deep, flex/universal type, 3", 6" extensions, ratchet سيت مفاتيح ربط	1 set
socket set, 3/8" drive: 5/16"-3/4" standard depth (12 point), 3/8"-3/4" deep (12 point), 5mm-19mm standard depth, 5mm-19mm deep, 3", 6", 10", 20" extensions, flexhead ratchet, ratchet, spark plug sockets 5/8", 13/16", universal joint سيت مفاتيح ربط	1 set
socket set, 1/2" drive: 1/2"-1-1/8" standard depth, 1/2"-1-1/8" deep, l2 mm-30 mm standard depth, l4 mm-27 mm deep, 3", 6", 10" extensions, flex handle (breaker bar), ratchet سيت مفاتيح ربط	1 set
wire stripper/crimper نازعة غلاف الاسلاك	1
brake spring installer مثبت زنبرك الكابح	1
brake spring pliers كماشة زنبرك الكابح	1
antifreeze tester فحص مانع التجمد جهاز	1
adjustable wrenches - 6", 10" and 12" مفاتيح ربط قابلة للتغيير	1
brake adjusting spoon ملعقة تنظيم المكابح	1
	1
test light (12V) فحص مصباح	1
hammer-plastic tip مطرقة بطرف بلاستيكي	1
ignition wrench set- US and metric مفاتيح ربط وحدة الاشتعال	1
CLASS ROOM AND SAFETY	
tablet arm chair دراسي كرسي	15

instructor's desk للمدرس مكتب	1
instructor's chair كرسي للمدرس	1
TV/VCR combination مجمعة تلفزيون/فيديو	1
overhead projector عارضة - اوفر هيد	1
file cabinet w/lock خزانة ملفات ذات قفل	2
storage cabinet (w/lock) خزانة للتخزين مع قفل	2
bookcase خزانة كتب	1
personal computer system w/printer (latest technology) حاسوب شخصي	1
first aid kit اسعافات اولية علبة	1
eye wash kit غسل العينين علبة	4
safety glasses (clear and tinted face shields, and goggles - for students, instructors, and visitors) نظارات وقاية	As reqd.
fire extinguishers (in accordance with local, state, and federal regulations [provided by center contract]) مطفأة حريق	As reqd.
trash cans (in accordance with local, state, and federal regulations) سلات مهملات	5
Cart, AV (for TV-VCR) عربة للتلفزيون والفيديو	1